PathMaster as an NGI Pilot Testbed
NGI Reverse Site Visit, 8/26/03

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Overview of Talk

- Project overview (Perry Miller)

- Project description (Mark Shifman)

PathMaster

- A cell image database indexed by mathematical descriptors and supported by parallel computation

- Two domains
  - lymphoma touch preparations
  - thyroid aspirates

- Status of digitized image collection
  - lymphoma: 639 cases, 1,477 cell images
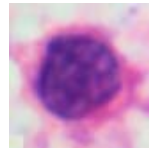 - thyroid: 656 cases, 2,990 cell images

Follicular center cell lymphoma
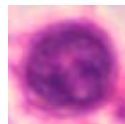

Lymphoid tissue NOS

Diffuse large cell lymphoma

Submitted image

Lymphoblastic lymphoma


Small non-cleaved cell lymphoma

PathMaster Database & Algorithms

- Oracle database
  - full field and cell images
  - clinical case information
  - mathematical descriptors from image analysis

- Web interface - submitting cases and viewing images

- Algorithms
  - automated cell segmentation
  - cell image analysis
  - cell image "database comparison"

Parallelization of PathMaster's Image Analysis Algorithms

- Cell image analysis
  - initial (1998) time to analyze a cell image: ~5 minutes
    (typical number of cell images per case: ~3-8)
  - current time to analyze a cell image: ~5-10 seconds

- Cell image "database comparison"
  - current time to compare a cell image against the
    database of cell images: ~ 1 second

NGI Pilot TestBed Architecture
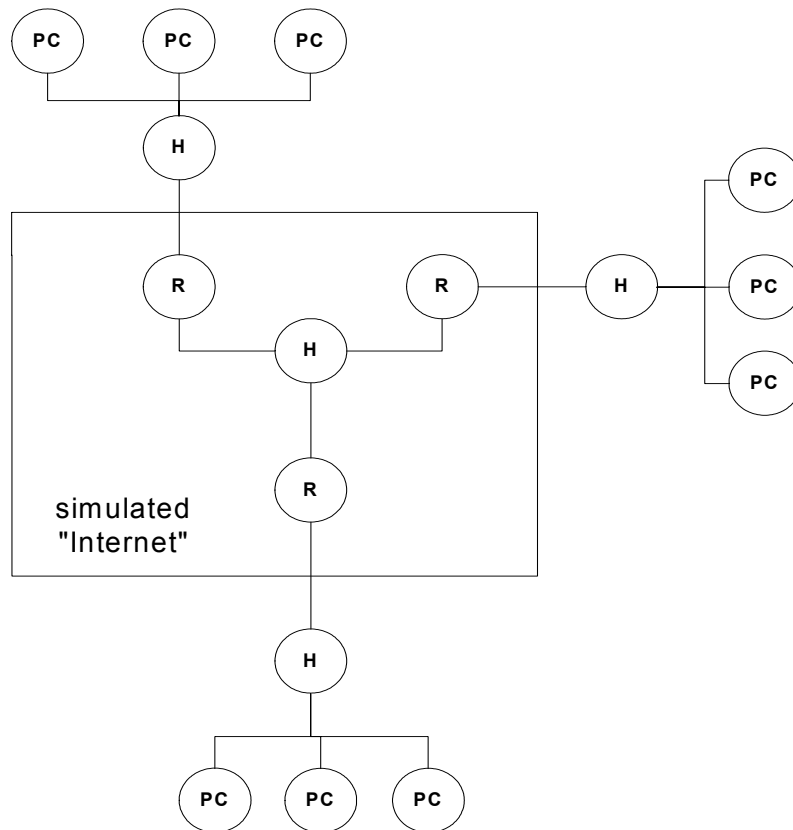
Multi-site Scenario
Sending cell images of a case to different "sites" for parallel analysis against "different" cell-image databases
(a future scenario that we used for our pilot testbed analyses)

Pilot Testing

- Issues of QoS and network management (the main focus of the pilot NGI project)

- Exploring different algorithmic strategies for comparing a test image against the PathMaster image database

Overall Assessment

- PathMaster illustrates an interesting future clinical use of the Internet.

- This type of application does not need real-time QoS capabilities.

- Predictability of response time is important.

- QoS strategies can help achieve this goal.